

AVIFAUNA OF THE ANDAMAN ISLANDS: PRELIMINARY INVENTORY AND DISTRIBUTIONAL PATTERNS¹PRIYA DAVIDAR^{2,5}, K. YOGANAND³, T. GANESH⁴ AND K. GEETHA NAYAK^{2,6}¹Accepted August 30, 2007²Department of Ecology and Environmental Sciences, Pondicherry University, Kalapet, Pondicherry 605 014, India.³Wildlife Institute of India, Post Bag # 18, Chandrabani, Dehradun 248 001, Uttarakhand, India. Email: k.yoganand@gmail.com⁴ATREE, 659, 5th A Main, Hebbal, Bengaluru 560 024, Karnataka, India. Email: tganesh@atree.org⁵Email: pdavidar@yahoo.com⁶Email: nayakk@gmail.com

The distribution of 78 species of resident birds from 27 families was recorded during a survey of 45 islands in the Andamans. The species richness of birds in each site was recorded by repeated walks along transects until the species accumulation curve reached an asymptote. Species restricted to larger islands were not recorded on smaller islands. The number of species in the different islands groups such as the North, Middle, South and Little Andaman islands, did not differ appreciably. Frugivores and omnivores tended to have a wider distribution than raptors, which tended to be restricted to larger islands. This database will provide a baseline with which to compare species distributions in the future.

Keywords: Andaman islands, avifauna, biodiversity assessment, island biogeography, species distribution

INTRODUCTION

Species on islands are more vulnerable to extinction than those on continents because besides factors such as the small population size of island species and lower chances for immigration or recolonisation of islands, they have usually evolved in isolation in a less complex ecosystem (e.g., with fewer predators, diseases and competitors), and therefore cannot face the multiple threats caused by humans. Many birds endemic to islands have gone extinct due to habitat loss, introduced diseases and introduced species (Pimm *et al.* 1995). Developing biodiversity inventories and monitoring changes in fauna can help to identify rare and threatened species, and those with declining populations.

The Andaman and Nicobar Islands, which lie off mainland India, have a rich biota which is facing serious threats due to increasing human pressure and developmental activities (Whitaker 1985; Saldanha 1989; Pande *et al.* 1991; Davidar *et al.* 1995). Therefore, documentation of the distributional patterns of species will provide information that can be used for immediate conservation action and for monitoring species over time. In this study, we provide information on the patterns of bird distribution in the Andaman Islands and interpret the results in the light of conservation priorities.

Pioneering surveys conducted by Abdulali (1964, 1981) on the avifauna of Andaman and Nicobar Islands helped to set up the foundation for more detailed assessments. Ripley and Beehler (1989) analysed the avifauna from an ornitho-geographical perspective and listed 104 species of breeding birds. These include 18 endemic species and 86 endemic races.

Davidar *et al.* (1995, 1996, 2001 and 2002) and Devy *et al.* (1998) conducted ecological surveys of forest birds and butterflies in the Andaman group in the 1990s. They showed that there is a latitudinal gradient in habitat diversity, with the southernmost islands in the Andaman group having a higher proportion of evergreen forests than the northern islands. They demonstrated that island size and the presence of evergreen forests significantly influenced species richness. The larger islands had more species, and rarer species, than did small islands. The avifauna of smaller islands was a nested subset of those on larger islands. Therefore, they suggested that conservation efforts should be focused on protecting forests on large islands, and evergreen forests in particular should be prioritised for conservation efforts.

An ornitho-geographic analysis on the Andaman and Nicobar avifauna was conducted by Ripley and Beehler (1989), who concluded that the avifauna of the Andamans were predominantly allied to that of Myanmar, whereas the Nicobar avifauna was a subset of the avifauna of the Andaman Islands. In this study, we present a preliminary island-wise inventory of the avifauna of the Andaman Islands, with particular emphasis on forest birds. We assessed the proportion of islands on which each species was distributed with regard to island size, location and the smallest island on which it was recorded. We also assessed whether the distribution patterns of foraging guilds differed with regard to island size and location.

STUDY AREA

The Andaman Islands lie between 10° 30'-13° 41' N and 92° 12'-93° 57' E, off the coast of south-east Asia in the

Bay of Bengal. The northernmost islands are about 285 km from Myanmar, and the southernmost is Little Andaman Island, located between the Andaman group and the Nicobars. Most of the land area of the Andamans consists of five large and contiguous islands, North Andaman Island, Middle Andaman Island, Baratang, South Andaman Island and Rutland. The Little Andamans, another large island is about 100 km south of South Andaman island and is separated from the Nicobars, which lie further south by the 140 km wide 10 degree channel.

The climate is tropical and oceanic with rainfall from both the Southwest and Northeast monsoon winds. The average annual rainfall is about 3,000 mm (Pande *et al.* 1991), increasing from the northern to the southern islands (Ellis 1989). This results in a north-south vegetation gradient with predominantly drier forests in the northern islands and wetter forests in the southern islands (Davidar *et al.* 2002). Evergreen forests are usually confined to large and medium sized islands, except towards the south where some small islands have evergreen forest; otherwise most small islands have dry forests (Davidar *et al.* 1995, 2002).

METHODS

Bird survey

The sampling was focused on forest birds, and therefore the sampling effort was concentrated within inland forested habitats, and therefore mangroves, swamps, mudflats and inland waterways, and nocturnal species were under sampled. However, we are including all records in this paper as a database for future reference.

A bird list for each island was compiled based on sightings along line transects. The number of transects depended on the size of the island, and several sites were sampled on the large islands, whereas the entire area was covered in case of small islands. In each site, the number of habitats was assessed and transects were walked in each habitat type in the mornings starting at dawn. A species list for each island was compiled based on the transect walks. All birds seen and heard were recorded and identified using Ali and Ripley (1987), and King *et al.* (1975). Casual sightings of birds were also used to compile the species list of each island.

We placed species in a foraging guild, i.e. insectivore, frugivore, raptor, based on observations and field notes from Ali and Ripley (1987) and Davidar *et al.* (1996). We classified birds of prey as raptors rather than carnivores based on the conventional usage of the term raptors to describe carnivorous birds.

Islands sampled

Forty-five islands in the Andaman group were surveyed during the dry season, from February to May in 1992 and 1993 and in February of 1994. A list of islands surveyed along with their area in sq. km is given in Table 1. This survey covered all the large islands, from North Andaman Island in the north to Little Andaman Island in the south, and most islands in the associated archipelagos (Davidar *et al.* 1995). For details of the survey methodology see earlier publications (Davidar *et al.* 1995, 1996, 2001, 2002).

The South Andamans and the Labyrinth Archipelago were surveyed from February to May 1992. Baratang, Ritchie's archipelago and seven islands off the North Andamans were surveyed from February to May 1993, and North Andaman Island and eleven associated islands were surveyed in February 1994. Little Andaman Island was surveyed in 1992 and 1994.

To facilitate data analysis we categorised the islands by location: the North Andamans, Middle Andamans and Baratang, South Andamans and Little Andaman island. Each island was classified as large (>20 sq. km), medium (10 to 19 sq. km), small (0.1 to 9 sq. km) or very small (<0.1 sq. km). There were 8 large islands, ranging from Peel (23 sq. km) to South Andaman island (>1000 sq. km), 7 medium islands ranging from Tarmugli (11.5 sq. km) to Long (14 sq. km), 25 small islands, ranging from Jolly Buoy (0.12 sq. km) to Paget (4 sq. km), and 5 very small islands (Table 1). We looked at the proportionate occurrence of species on island groups, and different island size categories. The smallest island on which a species tended to occur was noted, and the minimum area requirements for all species were estimated. The species recorded on all island sizes were categorised as "all". We looked at the distribution of species in different foraging guilds with regard to island location and island size.

RESULTS

Our inventory included 78 species of birds belonging to 27 families from 45 islands of different size categories (Appendices 1-3). Thirty of these species were not included in our earlier publications (Davidar *et al.* 1995, 1996, 2001, 2002) because our survey had focused on diurnal forest birds and these additional species were nocturnal species, were not primarily forest dwelling or were wetland avifauna. Some of the rare records were on the North Andaman group of islands.

The species distribution of birds on islands indicated that 20 species were found in fewer than 5 islands, and fewer than 5 species were found on over 40 islands (Fig. 1). Twenty-seven species (34%) were recorded on islands of all size

Table 1: Area in sq.km of the islands surveyed

Island	Area (sq. km)	Island size category
South Andamans	1,348	L
North Andamans	1,128	L
Little Andamans	675	L
Baratang	230	L
Rutland	116	L
Havelock	92	L
John Lawrence	35	L
Peel	23	L
Long	14	M
Wilson	14	M
Landfall	13	M
North Passage	13	M
Sound	12.7	M
Neil	12.6	M
Tarmugli	11.5	M
Paget	4	S
Alexandria	3.6	S
North Reef	3.4	S
Red Skin	3.3	S
East	3	S
Nicholson	1.8	S
North Cinque	1.6	S
Inglis	1.4	S
Guitar	1	S
Point	0.8	S
Malay	0.7	S
Reef	0.6	S
Hugh Rose	0.6	S
Delgarno	0.5	S
Twins	0.44	S
Middle Button	0.4	S
Excelsior	0.4	S
Ross(NA)	0.3	S
Ross(SA)	0.28	S
Pocock	0.25	S
Aves	0.25	S
North Button	0.25	S
Snob	0.22	S
Turtle	0.13	S
Jolly Buoy	0.12	S
Chester	0.09	VS
Curlew	0.07	VS
Temple	0.06	VS
Egg	0.06	VS
Grub	0.03	VS

L-Large, M-Medium, S-Small, VS-Very small

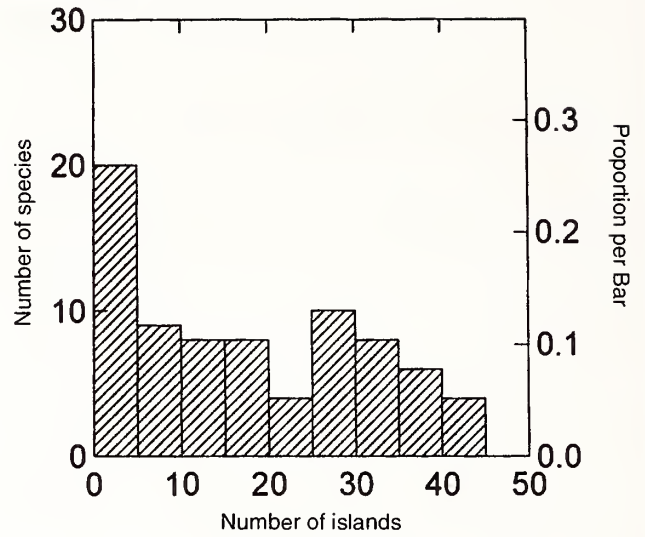


Fig. 1: Bird species distributions on islands

classes (Table 3). The majority of species were restricted to islands of particular size classes (Table 3). Fifty species (64%) were not found on islands <0.1 sq. km in area. Five species (6%) were recorded only on islands >10 sq. km and 11 species (14%) on islands >20 sq. km in area.

The distribution of guilds was strongly influenced by island size rather than by island location (Tables 2 and 4). Similar numbers of species were recorded in the different island groups, but Little Andamans had slightly fewer species than the other island groups, probably because of its isolation. Frugivores and omnivores tended to occur on islands of all sizes (Table 4), whereas raptors tended to be restricted to larger islands. A few species of insectivores and piscivores tended to occur only on large islands (Table 4).

DISCUSSION

Our assessment of bird distributions in the Andaman Islands indicates that the majority of species were restricted to larger than smaller islands. This supports our earlier observations that bird distributions in the Andaman Islands are strongly influenced by island size (Davidar *et al.* 2001). Ripley and Beehler (1989) stated that the avifauna of the Andamans is a subset of that of Myanmar and consists predominantly of widespread colonising species with high dispersal ability. Our study shows that many species do not

Table 2: Number of species of each feeding guild in the four island groups

Island group	Frugivore	Granivore	Insectivore	Nectarivore	Omnivore	Piscivore	Raptor
North	10	4	29	1	5	5	9
South	13	3	29	1	5	6	9
Middle	12	5	29	1	5	6	7
Little	11	2	23	1	4	5	8

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Table 3: Percentage of birds of each species recorded on 45 islands of different size classes and minimum area requirements of species

Family/Scientific name	Common name	Island size category				Minimum Island area requirements (sq.km)
		Large (>20 sq.km) (N=8)	Medium (10-19 sq.km) (N=7)	Small (0.1 sq.km) (N=25)	Very Small (<0.1 sq.km) (N=5)	
Accipitridae						
<i>Accipter nisus</i>	Eurasian Sparrow-Hawk	37.5	0	0	0	>20
<i>Accipter virgatus</i>	Besra Sparrow-hawk	100	42.86	12	0	>0.1
<i>Aviceda leuphotes</i>	Black Baza	87.5	42.86	4	0	>0.1
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	100	85.71	44	0	>0.1
<i>Spilornis cheela</i>	Crested Serpent-Eagle	100	71.43	28	0	>0.1
<i>Spilornis elgini</i>	Andaman Serpent-Eagle	100	100	36	12.5	All
<i>Spizaetus cirrhatus</i>	Changeable Hawk-Eagle	87.5	57.14	24	0	>0.1
Alcedinidae						
<i>Alcedo atthis</i>	Common Kingfisher	37.5	0	8	0	>0.1
<i>Todiramphus chloris</i>	Collared Kingfisher	100	100	28	12.5	All
<i>Halcyon coromanda</i>	Ruddy Kingfisher	0	0	24	12.5	All
<i>Halcyon pileata</i>	Black-capped Kingfisher	12.5	0	8	0	>20
<i>Halcyon smyrnensis</i>	White-throated Kingfisher	100	100	84	50	All
<i>Pelargopsis capensis</i>	Stork-billed Kingfisher	100	28.57	24	0	All*
Anatidae						
<i>Anas albogularis</i>	Andaman Teal	50	0	4	0	>0.1
<i>Dendrocygna javanica</i>	Lesser Whistling-duck	25	0	4	0	>0.1
Apodidae						
<i>Hirundapus giganteus</i>	Brown-throated Needletail	100	85.71	20	0	>0.1
Artamidae						
<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	87.5	100	44	0	>0.1
Burhinidae						
<i>Esacus recurvirostris</i>	Great Thick-Knee	0	0	12	0	>0.1
Campephagidae						
<i>Coracina dobsoni</i>	Andaman Cuckooshrike	37.5	0	4	0	>0.1
<i>Coracina macei</i>	Large Cuckooshrike	100	85.71	52	25	All
<i>Pericrocotus speciosus</i>	Scarlet Minivet	100	57.14	28	0	>0.1
<i>Pericrocotus cinnamomeus</i>	Small Minivet	100	85.71	76	12.5	All
Caprimulgidae						
<i>Caprimulgus macrurus</i>	Large-tailed Nightjar	100	14.29	12	12.5	All
<i>Eurostopodus macrotis</i>	Great Eared Nightjar	0	14.29	0	0	>10
Columbidae						
<i>Caloenas nicobarica</i>	Nicobar Pigeon	0	0	4	0	>0.1
<i>Chalcophaps indica</i>	Emerald Dove	100	85.71	48	12.5	All
<i>Columba palumboides</i>	Andaman Wood Pigeon	62.5	42.86	8	0	>0.1
<i>Ducula aenea</i>	Green Imperial Pigeon	100	85.71	68	12.5	All
<i>Ducula bicolor</i>	Pied Imperial Pigeon	50	0	4	0	>0.1
<i>Macropygia rufipennis</i>	Andaman Cuckoo Dove	100	28.57	28	0	>0.1
<i>Streptopelia decaocto</i>	Eurasian Collared-Dove	25	0	0	0	>20
<i>Streptopelia tranquebarica</i>	Red Collared-Dove	12.5	28.57	0	0	>10
<i>Treron chloropterus</i>	Andaman Green-Pigeon	100	100	56	0	>0.1
Coraciidae						
<i>Eurystomus orientalis</i>	Dollarbird	87.5	71.43	16	0	>0.1
Corvidae						
<i>Corvus culminatus</i>	Large-billed Crow	25	28.57	16	0	>0.1
<i>Dendrocitta bayleyi</i>	Andaman Treepie	87.5	14.29	4	0	>0.1
<i>Pachycephala grisola</i>	Mangrove Whistler	100	100	88	12.5	All
Cuculidae						
<i>Cacomantis sonneratii</i>	Banded Bay Cuckoo	12.5	0	0	0	>20
<i>Centropus andamanensis</i>	Andaman Coucal	100	100	68	0	>0.1
<i>Chrysococcyx xanthorhynchus</i>	Violet Cuckoo	50	14.29	0	0	>10
<i>Cuculus micropterus</i>	Indian Cuckoo	100	42.86	4	0	>0.1
<i>Eudynamys scolopacea</i>	Asian Koel	100	85.71	40	0	All*
Dicaeidae						
<i>Dicaeum minullum</i>	Plain Flowerpecker	100	100	64	37.5	All

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Table 3: Percentage of birds of each species recorded on 45 islands of different size classes and minimum area requirements of species (*contd.*)

Family/Scientific name	Common name	Island size category				
		Large (>20 sq.km) (N=8)	Medium (10-19 sq.km) (N=7)	Small (0.1 sq.km) (N=25)	Very Small (<0.1 sq.km) (N=5)	Minimum Island area requirements (sq.km)
Dicruridae						
<i>Dicrurus andamanensis</i>	Andaman Drongo	100	57.14	28	0	>0.1
<i>Dicrurus paradiseus</i>	Greater Racket-tailed Drongo	100	100	64	50	All
Irenidae						
<i>Irena puella</i>	Asian Fairy Bluebird	100	100	80	12.5	All
Laniidae						
<i>Lanius cristatus</i>	Brown Shrike	50	0	0	0	>20
Meropidae						
<i>Merops leschenaultii</i>	Chestnut-headed Bee-eater	100	100	60	25	All
<i>Merops philippinus</i>	Blue-tailed Bee-eater	12.5	0	0	0	>20
Monarchinae						
<i>Hypothymis azurea</i>	Black-naped Blue Monarch	100	100	80	25	All
<i>Terpsiphone paradisi</i>	Asian Paradise-Flycatcher	50	14.29	4	0	>0.1
Muscicapidae						
<i>Copsychus malabaricus</i>	White-rumped Shama	75	57.14	4	0	>0.1
<i>Copsychus saularis</i>	Oriental Magpie Robin	100	100	92	37.5	All
<i>Muscicapa dauurica</i>	Asian Brown Flycatcher	12.5	14.29	4	0	>0.1
Nectarinidae						
<i>Cinnyris jugularis</i>	Olive-backed Sunbird	100	100	96	62.5	All
Oriolidae						
<i>Oriolus xanthornus</i>	Black-hooded Oriole	62.5	0	0	0	>20
<i>Oriolus chinensis</i>	Black-naped Oriole	100	100	92	12.5	All
Picidae						
<i>Dryocopus hodgעי</i>	Andaman Woodpecker	100	71.43	20	0	>0.1
<i>Dryocopus javanensis</i>	White-bellied Woodpecker	100	71.43	24	0	>0.1
<i>Dendrocopus macei</i>	Fulvous-breasted Pied Woodpecker	100	100	60	0	All*
Ploceidae						
<i>Lonchura striata</i>	White-rumped Munia	37.5	28.57	0	0	>10
Psittacidae						
<i>Loriculus vernalis</i>	Vernal Hanging Parrot	100	100	80	50	All
<i>Psittacula alexandri</i>	Red-breasted Parakeet	100	100	32	12.5	All
<i>Psittacula eupatria</i>	Alexandrine Parakeet	100	85.71	64	12.5	All
<i>Psittacula longicauda</i>	Long-tailed Parakeet	100	85.71	60	0	>0.1
Pycnonotidae						
<i>Pycnonotus atriceps</i>	Black-headed Bulbul	87.5	42.86	4	0	>0.1
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	100	100	96	62.5	All
Rallidae						
<i>Amaurornis pheoniceus</i>	White-breasted Waterhen	25	0	0	0	>20
<i>Rallina canningi</i>	Andaman Crane	12.5	0	0	0	>20
Strigidae						
<i>Ninox scutulata</i>	Brown Hawk Owl	50	0	0	0	>20
<i>Tyto alba</i>	Barn Owl	25	0	0	12.5	>20
Sturnidae						
<i>Aplonis panayensis</i>	Asian Glossy Starling	100	85.71	56	0	>0.1
<i>Gracula religiosa</i>	Common Hill Myna	100	85.71	56	0	>0.1
<i>Sturnia erythropgia</i>	Andaman White-headed Starling	100	100	72	12.5	All
Sylviinae						
<i>Cettia pallidipes</i>	Pale-footed Bush-Warbler	62.5	14.29	4	0	>0.1
Turdinae						
<i>Saxicola torquatus</i>	Common Stonechat	0	0	4	0	>10
<i>Zoothera citrina</i>	Orange-headed Thrush	75	71.43	56	0	>0.1
Zosteropidae						
<i>Zosterops palpebrosus</i>	White-eye	100	100	92	12.5	All

*Species recorded in casual sightings on all islands (Davidar pers. obs.)

Table 4: Smallest island size (sq. km) in which the different feeding guilds were recorded

Feeding category	Island size			All islands
	>20 sq. km	>10 sq. km	>0.1 sq. km	
Frugivore	0	0	7	6
Granivore	1	2	1	1
Insectivore	4	3	17	9
Nectarivore	0	0	0	1
Omnivore	0	0	2	2
Piscivore	3	0	5	5
Raptor	3	0	5	1

occur on smaller islands, probably due to the absence of their preferred habitat. The avifauna on the small and very small islands tends to consist of vagrants that are widely distributed across all habitat types (Davidar *et al.* 1995, 2001, 2002; Yoganand and Davidar 2000).

The restricted distribution of many species might be due to low dispersal ability or the inability of smaller islands to support viable populations of certain species. The raptors that are at the top of the food chain, and occur at lower densities, were less common on smaller islands (Thiollay 1997). It is quite possible that small islands are not able to support viable populations of raptors, whereas frugivores that depend on a resource that is spatially and temporally

unpredictable were widely distributed on islands of all sizes. Frugivores tend to be very mobile and fly over large distances in search of fruiting trees.

Certain species were only recorded on large islands, regardless of feeding category. These species might be specialised to particular habitats found predominantly on larger islands, such as the wet evergreen forests. We found that many species, such as *Columba palumboides*, *Macropygia rufipennis*, *Treron pompadora* and *Gracula religiosa* were associated with wet evergreen forests (Yoganand and Davidar 2000), and are therefore not likely to be recorded on smaller islands that tend to have scrubby or dry vegetation.

In conclusion, assessing the distributions of birds on islands can provide insights into the factors that govern their distribution. This database can provide baseline information with which to record changes in species distributions in the future, and thus has enormous importance for conservation.

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Appendix 1: Distribution of avifauna in the North Andaman island group. Islands are arranged in a descending order of size, from left to right

Family / Scientific name	North Andaman Island Group																	
	North Andaman	Landfall	Sound	Paget	North Reef	East	Point	Reef	Delgarno	Excelsior	Ross (NA)	Pocock	Aves	Turtle	Curlew	Temple	Egg	
Accipitridae																		
<i>Accipter nisus</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Accipter virgatus</i>	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>Aviceda leuphotes</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Haliaeetus leucogaster</i>	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Spilornis cheela</i>	1	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0
<i>Spilornis elgini</i>	1	1	1	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0
<i>Spizaetus cirrhatus</i>	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Alcedinidae																		
<i>Todirhamphus chloris</i>	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Halcyon smymensis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<i>Halcyon capensis</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anatidae																		
<i>Anas albogularis</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Dendrocygna javanica</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apodidae																		
<i>Hirundapus giganteus</i>	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Artamidae																		
<i>Artamus leucorhynchus</i>	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Campephagidae																		
<i>Coracina macei</i>	1	1	1	1	0	1	1	1	0	0	0	0	0	0	1	1	0	0
<i>Pericrocotus cinnamomeus</i>	1	1	0	0	1	1	0	1	0	1	0	1	1	0	0	0	0	0
<i>Pericrocotus speciosus</i>	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Caprimulgidae																		
<i>Caprimulgus macurus</i>	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>Eurostopus macrotis*</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbidae																		
<i>Chalcophaps indica</i>	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
<i>Ducula aenea</i>	1	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0
<i>Ducula bicolor</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Macropygia rufipennis</i>	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>Streptopelia decaocto</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Treron chloropterus</i>	1	1	1	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0
Coraciidae																		
<i>Eurystomus orientalis</i>	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Corvidae																		
<i>Dendrocitta bayleyi</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pachycephala grisola</i>	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0
Cuculidae																		
<i>Cacomantis sonneratii</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Centropus andamanensis</i>	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0
<i>Chrysococcyx xanthorhynchus</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cuculus micropterus</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eudynamis scolopacea</i>	1	1	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0
Dicaeidae																		
<i>Dicaeum minullum</i>	1	1	1	1	0	1	1	0	1	1	1	1	0	1	1	1	1	1

AVIFAUNA OF THE ANDAMAN ISLANDS

Appendix 1: Distribution of avifauna in the North Andaman island group. Islands are arranged in a descending order of size, from left to right (contd.)

Family / Scientific name	North Andaman Island Group																	
	North Andaman	Landfall	Sound	Paget	North Reef	East	Point	Reef	Delgarno	Excelsior	Ross (NA)	Pocock	Aves	Turtle	Curlew	Temple	Egg	
Dicruridae																		
<i>Dicrurus andamanensis</i>	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
<i>Dicrurus paradiseus</i>	1	1	1	1	0	1	1	1	1	0	0	0	0	0	1	0	1	0
Irenidae																		
<i>Irena puella</i>	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0
Meropidae																		
<i>Merops leschenaultii</i>	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0
<i>Merops philippinus</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monarchinae																		
<i>Hypothymis azurea</i>	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0
Muscicapidae																		
<i>Copsychus saularis</i>	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0	0
<i>Muscicapa dauurica*</i>	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Nectarinidae																		
<i>Cinnyris jugularis</i>	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
Oriolidae																		
<i>Oriolus chinensis</i>	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
<i>Oriolus xanthomus</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Picidae																		
<i>Dryocopus hodgei</i>	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Dryocopus javanensis</i>	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>Dendrocopos macei</i>	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0
Ploceidae																		
<i>Lonchura striata*</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae																		
<i>Loriculus vernalis</i>	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
<i>Psittacula alexandri</i>	1	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
<i>Psittacula eupatria</i>	1	0	1	0	0	0	1	0	0	1	1	1	1	1	0	1	0	0
<i>Psittacula longicauda</i>	1	1	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0
Pycnonotidae																		
<i>Pycnonotus jocosus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
<i>Pycnonotus atriceps</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strigidae																		
<i>Ninox scutulata</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Tyto alba*</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sturnidae																		
<i>Aplonis panayensis</i>	1	1	0	1	0	0	1	0	1	1	1	0	1	0	0	0	0	0
<i>Gracula religiosa</i>	1	1	0	0	0	1	1	1	0	1	1	1	0	1	0	0	0	0
<i>Sturnia erythropgia</i>	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	0	0	0
Turdinae																		
<i>Saxicola torquata</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Zoothera citrina</i>	1	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0
Zosteropidae																		
<i>Zosterops palpebrosus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0

* - Species recorded during casual sightings on all islands (Davidar pers. obs.)

Appendix 2: Distribution of avifauna in the South Andaman island group. Islands are arranged in a descending order of size, from left to right

Family / Scientific name	South Andaman Island Group													
	South Andamans	Little Andaman	Rutland	Tarnugli	Alexandra	Redskin	North Cinque	Malay	Twins	Ross (SA)	Snob	Jolly Buoy	Chester	Grub
Accipitridae														
<i>Accipter nisus</i>	1	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Accipter virgatus</i>	1	1	1	1	0	0	0	0	0	0	0	0	0	0
<i>Aviceda leuphotes</i>	1	1	1	0	0	0	0	0	0	0	0	0	0	0
<i>Haliaeetus leucogaster</i>	1	1	1	1	1	1	0	1	0	1	0	0	0	0
<i>Spilornis cheela</i>	1	1	1	0	0	1	0	0	0	0	0	0	0	0
<i>Spilornis elgini</i>	1	1	1	1	1	1	1	1	0	0	0	0	0	0
<i>Spizaetus cirrhatus</i>	1	1	1	1	1	1	1	0	0	0	0	0	0	0
Alcedinidae														
<i>Alcedo atthis</i>	1	0	1	0	1	0	0	0	0	0	0	1	0	0
<i>Todirhamphus chloris</i>	1	1	1	1	1	1	0	1	1	1	0	0	1	0
<i>Halcyon coromanda</i>	0	0	0	0	1	1	0	1	1	1	1	0	1	0
<i>Halcyon pileata</i>	0	0	0	0	0	1	0	0	0	0	1	0	0	0
<i>Halcyon smymensis</i>	1	1	1	1	1	1	0	1	1	1	1	1	1	0
<i>Halcyon capensis</i>	1	1	1	0	1	1	1	0	0	1	0	0	0	0
Anatidae														
<i>Anas albogularis</i>	1	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>Dendrocygna javanica</i>	1	0	0	0	0	1	0	0	0	0	0	0	0	0
Apodidae														
<i>Hirundapus giganteus</i>	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Artamidae														
<i>Artamus leucorhynchus</i>	1	1	1	1	1	0	1	0	1	1	0	0	0	0
Campephagidae														
<i>Coracina macei</i>	1	1	1	1	1	1	1	1	0	0	1	0	0	0
<i>Coracina dobsoni</i>	1	0	1	0	1	0	0	0	0	0	0	0	0	0
<i>Pericrocotus cinnamomeus</i>	1	1	1	1	1	1	1	0	1	1	1	1	0	1
<i>Pericrocotus speciosus</i>	1	1	1	1	1	1	0	1	0	0	0	0	0	0
Caprimulgidae														
<i>Caprimulgus macrurus</i>	1	1	1	0	1	1	0	0	0	0	0	0	0	1
Columbidae														
<i>Caloenas nicobarica</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Chalcophaps indica</i>	1	1	1	1	1	1	1	0	0	1	1	1	1	0
<i>Columba palumboides</i>	1	0	1	1	1	0	0	0	0	0	0	0	0	0
<i>Ducula aenea</i>	1	1	1	1	1	1	1	1	1	0	1	0	0	1
<i>Ducula bicolor</i>	1	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Macropygia rufipennis</i>	1	1	1	0	1	1	1	1	0	0	1	0	0	0
<i>Treron chloropterus</i>	1	1	1	1	1	1	0	1	0	0	1	0	0	0
Coraciidae														
<i>Eurystomus orientalis</i>	1	1	1	1	1	1	0	0	0	0	1	0	0	0
Corvidae														
<i>Corvus culminatus</i>	0	0	0	0	1	1	0	0	0	0	0	1	0	0
<i>Dendrocitta bayleyi</i>	1	1	1	0	1	0	0	0	0	0	0	0	0	0
<i>Pachycephala grisola</i>	1	1	1	1	1	1	1	1	0	0	1	1	1	0

AVIFAUNA OF THE ANDAMAN ISLANDS

Appendix 2: Distribution of avifauna in the South Andaman island group. Islands are arranged in a descending order of size, from left to right (contd.)

Family / Scientific name	South Andaman Island Group													
	South Andamans	Little Andaman	Rutland	Tarnugli	Alexandra	Redskin	North Cinque	Malay	Twins	Ross (SA)	Snob	Jolly Buoy	Chester	Grub
Cuculidae														
<i>Centropus andamanensis</i>	1	1	1	1	1	1	1	1	0	1	1	1	0	0
<i>Chrysococcyx xanthorhynchus</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cuculus micropterus</i>	1	1	1	1	1	0	0	0	0	0	0	0	0	0
<i>Eudynamis scolopacea</i>	1	1	1	1	1	1	0	1	0	1	1	0	0	0
Dicaeidae														
<i>Dicaeum minullum</i>	1	1	1	1	1	1	0	1	0	0	1	1	0	0
Dicruridae														
<i>Dicrurus andamanensis</i>	1	1	1	1	1	1	1	0	0	0	1	0	0	0
<i>Dicrurus paradiseus</i>	1	1	1	1	1	1	1	1	0	1	1	1	1	1
Irenidae														
<i>Irena puella</i>	1	1	1	1	1	1	1	0	1	1	1	0	1	0
Laniidae														
<i>Lanius cristatus</i>	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Meropidae														
<i>Merops leschenaultii</i>	1	1	1	1	1	1	1	0	1	1	1	0	1	1
Monarchinae														
<i>Hypothymis azurea</i>	1	1	1	1	1	1	1	1	0	0	1	1	1	0
<i>Terpsiphone paradisi</i>	1	0	1	0	1	0	0	0	0	0	0	0	0	0
Muscicapidae														
<i>Copsychus malabaricus</i>	1	1	1	1	1	0	0	0	0	0	0	0	0	0
<i>Copsychus saularis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Nectarinidae														
<i>Cinnyris jugularis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Oriolidae														
<i>Oriolus chinensis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	0
<i>Oriolus xanthornus</i>	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Picidae														
<i>Dryocopus hodgei</i>	1	1	1	1	1	1	0	1	0	0	0	1	0	0
<i>Dryocopus javanensis</i>	1	1	1	1	1	1	0	1	0	0	0	1	0	0
<i>Dendrocopos macei</i>	1	1	1	1	1	1	1	1	0	1	1	0	0	0
Ploceidae														
<i>Lonchura striata*</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Psittacidae														
<i>Loriculus vernalis</i>	1	1	1	1	1	1	1	1	0	0	0	1	1	0
<i>Psittacula alexandri</i>	1	1	1	1	1	1	1	0	0	1	1	0	0	0
<i>Psittacula eupatria</i>	1	1	1	1	1	1	1	1	1	0	1	0	0	0
<i>Psittacula longicauda</i>	1	1	1	1	1	1	0	1	1	0	0	0	0	0
Pycnonotidae														
<i>Pycnonotus jocosus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<i>Pycnonotus atriceps</i>	1	1	1	0	0	0	0	0	0	0	0	0	0	0

Appendix 2: Distribution of avifauna in the South Andaman island group. Islands are arranged in a descending order of size, from left to right (contd.)

Family / Scientific name	South Andaman Island Group													
	South Andamans	Little Andaman	Rutiland	Tarmugli	Alexandra	Redskin	North Cinque	Malay	Twins	Ross (SA)	Snob	Jolly Buoy	Chester	Grub
Falidae														
<i>Amauromis pheonicurus</i>	1	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Falina canningi*</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Strigidae														
<i>Ninox scutulata</i>	1	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Tyto alba*</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Sturnidae														
<i>Aplonis panayensis</i>	1	1	1	1	1	1	1	0	0	1	1	0	0	0
<i>Gracula religiosa</i>	1	1	1	1	1	1	1	1	0	0	1	0	0	0
<i>Sturnia erythropygia</i>	1	1	1	1	1	1	1	0	0	0	0	0	0	0
Sylviinae														
<i>Cettia pallidipes</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Turdinae														
<i>Zoothera citrina</i>	1	0	1	1	0	1	1	1	1	0	1	1	0	0
Zosteropidae														
<i>Zosterops palpebrosus</i>	1	1	1	1	1	1	1	1	1	0	0	1	0	0

* - Species recorded in casual sightings on all islands (Davidar pers. obs.)

Appendix 3: Distribution of avifauna in the Middle Andaman island group. Islands are arranged in a descending order of size, from left to right

Family/Scientific name	Middle Andaman Island Group													
	Baratang	Havelock	John Lawrence	Peel	Long	Wilson	North Passage	Neil	Nicholson	Inglis	Guitar Button	Sir Hugh Rose Button	Middle	North
Accipitridae														
<i>Accipter virgatus</i>	1	1	1	1	1	0	0	1	0	0	0	0	0	0
<i>Aviceda leuphotes</i>	1	1	1	0	1	0	1	1	0	0	1	0	0	0
<i>Haliaeetus leucogaster</i>	1	1	1	1	1	0	1	1	1	0	1	0	1	1
<i>Spilornis cheela</i>	1	1	1	1	1	1	1	1	1	0	0	1	0	0
<i>Spilornis elgini</i>	1	1	1	1	1	1	1	1	0	0	1	0	0	0
<i>Spizaetus cirrhatus</i>	1	1	1	0	1	0	1	1	0	0	0	0	1	0
Alcedinidae														
<i>Alcedo atthis</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Todirhamphus chloris</i>	1	1	1	1	1	1	1	1	0	1	0	1	0	0
<i>Halcyon smyrnensis</i>	1	1	1	1	1	1	1	1	1	0	1	1	0	0
<i>Halcyon capensis</i>	1	1	1	1	1	0	0	1	0	0	0	1	0	1
Anatidae														
<i>Anas albugularis</i>	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Apodidae														
<i>Hirundapus giganteus</i>	1	1	1	1	1	1	1	1	0	1	1	1	0	0

Appendix 3: Distribution of avifauna in the Middle Andaman island group. Islands are arranged in a descending order of size, from left to right (contd.)

Family/Scientific name	Middle Andaman Island Group													
	Baratang	Havelock	John Lawrence	Peel	Long	Wilson	North Passage	Neil	Nicholson	Inglis	Guitar Button	Sir Hugh Rose Button	Middle	North
Artamidae														
<i>Artamus leucorhynchus</i>	1	1	1	1	1	1	1	1	0	1	1	1	1	1
Burhinidae														
<i>Esacus recurvirostris</i>	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Campephagidae														
<i>Coracina macei</i>	1	1	1	1	1	1	1	0	1	1	1	0	1	0
<i>Coracina dobsoni</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pericrocotus cinnamomeus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	0
<i>Pericrocotus speciosus</i>	1	1	1	1	1	1	1	0	1	0	1	0	0	0
Caprimulgidae														
<i>Caprimulgus macrurus</i>	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Columbidae														
<i>Chalcophaps indica</i>	1	1	1	1	1	1	1	1	0	1	0	1	1	0
<i>Columba palumboides</i>	1	1	0	1	0	1	0	1	1	0	0	0	0	0
<i>Ducula aenea</i>	1	1	1	1	1	1	1	1	1	1	1	0	1	1
<i>Ducula bicolor</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Macropygia rufipennis</i>	1	1	1	1	1	1	0	0	1	0	0	0	0	0
<i>Streptopelia decaocto</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Streptopelia tranquebarica</i>	0	0	0	0	1	0	0	1	0	0	0	0	0	0
<i>Treeron chloropterus</i>	1	1	1	1	1	1	1	1	1	1	0	1	1	0
Coraciidae														
<i>Eurystomus orientalis</i>	1	1	1	0	1	1	1	1	0	0	0	0	0	0
Corvidae														
<i>Corvus culminatus</i>	0	1	0	0	1	1	0	0	1	0	0	0	0	0
<i>Dendrocitta bayleyi</i>	1	1	1	0	1	0	0	0	0	0	0	0	0	0
<i>Pachycephala griseola</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cuculidae														
<i>Centropus andamanensis</i>	1	1	1	1	1	1	1	1	1	1	0	0	1	1
<i>Chrysococcyx xanthorhynchus</i>	0	1	1	0	1	0	0	0	0	0	0	0	0	0
<i>Cuculus micropterus</i>	1	1	1	1	1	0	1	0	0	0	0	0	0	0
<i>Eudynamis scolopacea</i>	1	1	1	1	1	1	1	1	0	0	0	1	0	0
Dicaeidae														
<i>Dicaeum minullum</i>	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Dicruridae														
<i>Dicrurus andamanensis</i>	1	1	1	1	1	1	1	0	1	0	0	0	0	0
<i>Dicrurus paradiseus</i>	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Irenidae														
<i>Irena puella</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Laniidae														
<i>Lanius cristatus</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Meropidae														
<i>Merops leschenaultii</i>	1	1	1	1	1	1	1	1	0	0	1	0	1	1

Appendix 3: Distribution of avifauna in the Middle Andaman island group. Islands are arranged in a descending order of size, from left to right (contd.)

Family/Scientific name	Middle Andaman Island Group													
	Baratang	Havelock	John Lawrence	Peel	Long	Wilson	North Passage	Neil	Nicholson	Inglis	Guitar Button	Sir Hugh Rose Button	Middle	North
Monarchinae														
<i>Hypothymis azurea</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	0
<i>Terpsiphone paradisi</i>	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Muscicapidae														
<i>Copsychus malabaricus</i>	1	1	1	0	1	0	1	1	0	0	0	0	0	0
<i>Copsychus saularis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Nectarinidae														
<i>Cinnyrus jugularis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Ortolidae														
<i>Oriolus chinensis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<i>Oriolus xanthornus</i>	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Picidae														
<i>Dryocopus hodgei</i>	1	1	1	1	1	1	1	0	1	0	0	0	0	0
<i>Dryocopus javanensis</i>	1	1	1	1	1	1	1	0	1	0	0	0	0	0
<i>Dendrocopos macei</i>	1	1	1	1	1	1	1	1	1	1	1	0	1	0
Ploceidae														
<i>Lonchura striata*</i>	0	0	0	1	1	0	0	1	0	0	0	0	0	0
Psittacidae														
<i>Loriculus vernalis</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	0
<i>Psittacula alexandri</i>	1	1	1	1	1	1	1	1	0	1	0	0	0	0
<i>Psittacula eupatria</i>	1	1	1	1	1	1	1	1	1	1	1	0	0	0
<i>Psittacula longicauda</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pycnonotidae														
<i>Pycnonotus jocosus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<i>Pycnonotus atriceps</i>	1	1	1	0	1	1	1	0	0	0	1	0	0	0
Strigidae														
<i>Ninox scutulata</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Sturnidae														
<i>Aplonis panayensis</i>	1	1	1	1	1	1	1	1	1	1	1	0	0	0
<i>Gracula religiosa</i>	1	1	1	1	1	1	1	1	1	0	1	0	0	0
<i>Sturnus erythropygus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sylviinae														
<i>Cettia pallidipes</i>	1	1	1	1	1	0	0	0	1	0	0	0	0	0
Turdinae														
<i>Zoothera citrina</i>	1	1	1	0	1	1	1	1	1	0	0	0	1	1
Zosteropidae														
<i>Zosterops palpebrosus</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1

* - Species recorded during casual sightings on all islands (Davidar pers. obs.)